# WORKSHEET 1

## CHAPTER 5 – THE PERIODIC TABLE

### A. Tick (✓) the correct option.

1. The contribution made by Newland's Law of Octaves to the development of the Periodic Table was
   a. the idea of atomic mass.
   b. use of atomic number.
   c. the use of repeating properties.
   d. the introduction of periods and families.
2. In Mendeleev's Periodic Table, elements in each column had similar
   a. atomic masses.
   b. atomic numbers.
   c. properties.
   d. symbols.
3. Each column of the Periodic Table is
   a. an element.
   b. group.
   c. an isotope.
   d. a period.
4. Atoms of elements belonging to the same group have same number of
   a. protons.
   b. neutrons.
   c. valence electrons.
   d. protons and neutrons.
5. On moving from left to right across a period of the Periodic Table, the valency of an element
   a. increases.
   b. decreases.
   c. remains the same.
   d. first increases and then decreases.

### B. Fill in the blanks from the choices given within the brackets.

1. The number of electrons in the valence shell of an element represents its _____ (period/group)
2. The _____ (metals/non-metals) are placed on the right hand side of the Periodic Table.
3. The chemical properties of elements are the periodic functions of their _____ (mass numbers/atomic numbers)
4. The elements occupying left and right wings of vertical columns are called _____ (transition/normal) elements.
5. The element at the bottom of a group would be expected to show _____ (less/more) metallic character than the element at the top.

### C. Name the following.

1. A group containing the elements having zero valencies.
2. An alkali metal having electronic configuration 2, 8, 1.
3. An incomplete period present in the long form of the Periodic Table.
4. Longest period of the Periodic Table.
5. An element having duplet arrangement of electrons.

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## D. Match the following.

| | |
|---|---|
| 1. Highly reactive metals | Transition elements |
| 2. Elements with seven valence electrons | Actinides |
| 3. Rare-earth elements | Alkali metals |
| 4. Elements of group 3 to 12 | Noble gases |
| 5. Chemically unreactive elements | Halogens |

## E. Answer the following.

1. The elements A and B obey the Law of Octaves. How many elements are between A and B?
2. a. Which period in the Periodic Table is shortest?

   b. Name all the elements present in the second period.
3. Silicon (atomic no. 14) and Phosphorus (atomic no. 15) belong to the same period of the Periodic Table. Write down the electronic configuration of Silicon and Phosphorus. Name the groups to which these elements belong.
4. a. How does the atomic size change in a period?

   b. Arrange the elements given in the table below, such that the least metallic element comes first and the most metallic element comes last.

| **Element** | P | Q | R |
|---|---|---|---|
| **Atomic size** | 1.86 Å | 2.31 Å | 1.52 Å |

5. a. How were elements arranged in the Modern Periodic Table?

   b. State the Modern Periodic Law and compare it with Mendeleev's Periodic Law.

   c. State any two merits and demerits of Modern Periodic Table.

# ANSWERS

## WORKSHEET 1

### A. Tick (✓) the correct option.

1. c
2. c
3. b
4. c
5. d

### B. Fill in the blanks from the choices given within the brackets.

1. group
2. non-metals
3. atomic numbers
4. normal
5. more

### C. Name the following.

1. Group B ($18^{th}$ group)
2. Sodium
3. Seventh period
4. Period six
5. Helium

### D. Match the following.

| | |
|---|---|
| 1. Highly reactive metals | Alkali metals |
| 2. Elements with seven valence electrons | Halogens |
| 3. Rare-earth elements | Actinides |
| 4. Elements of group 3 to 12 | Transition elements |
| 5. Chemically unreactive elements | Noble gases |

### E. Answer the following.

1. There are six elements between A and B.
2. a. Period 1 is the shortest period with only two elements.
   b. Hydrogen and Helium.
3. The electronic configuration of

| | *K* | *L* | *M* |
|---|---|---|---|
| a. Silicon | 2 | 8 | 4 |
| b. Phosphorus | 2 | 8 | 5 |

   As there are four valence electrons in Silicon, it belongs to group 14. In the same way, Phosphorus contains five valence electrons, therefore, it belongs to group 15.

4. a. On moving along a period, the size of atoms decreases.
   b. $\underset{(1.52\ Å)}{R}$, $\underset{(1.86\ Å)}{P}$ and $\underset{(231\ Å)}{Q}$
5. a. In the Modern Periodic Table, elements were arranged in the order of increasing atomic numbers.
   b. Modern Periodic Law states that, "the physical and chemical properties of elements are periodic functions of their atomic numbers".

      However, Mendeleev's Periodic Law was based on atomic masses. It states that, "the physical and chemical properties of elements are periodic functions of their atomic masses."
   c. **Merits:** i. The classification is based on the fundamental property of elements, i.e. atomic number.
      ii. The Modern Periodic Table relates the position of an element to its electronic configuration of the valence shell and hence, the elements will have similar chemical properties.

      **Demerits:** i. The position of hydrogen is not justified.
      ii. It fails to accommodate lanthanides and actinides in the main body of the table.